LEWISBURG FURNACE
On the Indian River
Harrisville Vicinity
Lewis County
New York

HAER No. NY-189

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
Northeast Region
Philadelphia Support Office
200 Chestnut Street
Philadelphia, Pennsylvania 19106

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LEWISBURG FURNACE

HAER NO. NY-189

LOCATION:	On the Indian River, Harrisville Vicinity, Lewis County, New York UTM: 18.458301.4884901 QUAD: Lake Bonaparte, New York
DATE OF CONSTRUCTION:	1832; reconstructed ca. 1837, 1852,1873
PRESENT OWNER:	United States Army, 10th Mountain Division, Fort Drum, Watertown, New York
PRESENT USE:	Abandoned 1881.
SIGNIFICANCE:	The Lewisburg iron furnace is a representative example of a small-scale blast furnace, fueled by charcoal, used to produce iron ore prior to introduction of coal-fired furnaces in the U.S. in the mid-19th century. It was one of four charcoal iron works which were developed, with varying success, in those areas of Jefferson and Lewis Counties now contained within the Fort Drum Military Reservation. The Lewisburg furnace was first constructed in 1832, and is believed to been rebuilt at least twice prior to its abandonment in 1881. The iron works were the focus of the village of Louisbourg, renamed Sterlingbush in the 1850's and renamed yet again, as Lewisburg, in the 1870's. The furnace stack and portions of the wheel pit are the principal structural remains of the village today.
PROJECT INFORMATION:	Lewisburg Furnace was recorded in May 1988 by Louis Berger & Associates, Inc. for the Mid-Atlantic Region of the National Park Service, Philadelphia, and the 10th Mountain Division, Fort Drum, New York. The project team consisted of Martha H. Bowers, Architectural Historian; Alain Outlaw, Archaeologist; Henry Holt, Archaeologist; Rob Tucher, Photographer; Ingrid Wuebber, Historian; Catherine Shadock, Research Assistant; and John R. Bowie, A.I.A., Consulting Architect.

DESCRIPTION

The Lewisburg iron furnace is situated within the former townsite of Lewisburg (also known as Sterlingbush) in the extreme west corner of Diana Township, Lewis County, New York. Since 1942, the townsite has been contained within the U. S. Army's Fort Drum Reservation, which encompasses portions of Jefferson and Lewis Counties in far northern New York state.

The Lewisburg townsite was a linear settlement occupying land on both sides of the Indian River, the two sides connected by means of a short deck bridge across the stream. A variety of foundation remains are present, most on the south side of the river. The only standing structure within the townsite is the ruin of the stack of the iron furnace.

The furnace stack is situated on the south bank of the Indian River, approximately 200 feet upstream from the bridge and 50 feet back from the water's edge. The structure is approximately 25 feet square at the base, rising to a truncated height of about 30 feet. The battered exterior walls are constructed of rubble ashlar sandstone from which much of the mortar has weathered away. At three levels, beginning approximately 13 feet above present grade, large timbers span the width of each elevation; at the corners are mortise-and-tenon joints which are reinforced with iron tie rods inserted diagonally and held in place with anchor bolts. These elements functioned as compression rings to increase the stability of the stack during periods of heating (expansion) and cooling (contraction) in the firing process.

Roughly centered at the base of the stack, in the west, south and north elevations, are openings with triangular heads created by projection of each thin, flat soffit stone a short distance beyond the one below. In each instance, the spring line of the opening is located some three feet above existing grade. The hearth or work arch, located in the west elevation, has been largely destroyed as a result of collapse of masonry above and behind it, but at the base is approximately 12 feet wide. The tuyere openings on north and south, however, are largely intact, rising 4.5 feet above the spring line, with a grade-level width of 8 feet 9 inches.

The interior of the furnace has collapsed, leaving little evidence of the structure's coarse firebrick lining. Below remains of the square tunnel head, the 7.4 foot diameter circular furnace widens to 12.6 feet at the level of the bosh, which is approximately 11 feet above existing grade. Originally and during the course of its operating lifetime, the furnace was lined with firebrick, which decreased the sizes of the abovementioned openings accordingly.

Given the orientation of the stack and the location of its openings, it appears that the casting house (into which molten iron would be drawn off from the furnace and made into pigs and castings) was situated on the west side of the stack. No above-ground physical evidence of such a structure has been located, however. The furnace would have been charged from the east side, where a slight, debris-strewn elevation is all that remains to indicate the position of the elevated wooden bridge by which charcoal, limestone flux and iron ore were introduced into the furnace.

In a furnace such as the one at Lewisburg, iron ore was heated in burning charcoal mixed with a limestone flux to facilitate separation of liquid iron from the impurities also found in the rock. Oxygen to sustain the burning, and to control temperatures, was provided by blast machinery (Weitzman 1980:139-140). At Lewisburg, water power was used to operate blast machinery. North of the stack, between the stack and the river bank, is a stone-walled channel, measuring approximately 10 feet x 30 feet. Within this channel or pit was a water wheel, reported in 1867 to be of the breast type with 18-foot diameter and nine-foot buckets (Nielsen 1867), the axle of which would have been carried on timber blocks mounted on the tops of each wall.

An overgrown earthen embankment, located 60 feet northeast of the stack, marks the southern end of a now-breached dam across the Indian River. Although no physical evidence remains, it is probable that head to operate the wheel was drawn off from behind the dam and conveyed via an open channel to a wooden sluice box and thence to the wheel. The water would then flow through the pit into a raceway (discernable now only as a slight depression in the vegetation-covered ground), and thus back into the Indian River.

According to Nielsen (1867) and AISA (1882), the blast at Lewisburg was cold (i.e. unheated). Given the position of the wheel pit with relation to the stack, it is likely that the blast machinery was located between the pit and the stack, with a pipe leading from the machinery to a 2 1/4-inch tuyere (moveable nozzle) at the north tuyere opening (Nielsen 1867).

The only other structural features present in the vicinity of the stack are situated roughly opposite the west end of the wheel pit, but their relationship, if any, to iron-making activities here is not known. The features, of coarse conglomerate concrete, consist of two parallel rows of short pedestals protruding about 4 feet above grade. West of this is an H-shaped concrete foundation, with another pedestal centrally placed between the southern arms of the H. Still further west, and

oriented perpendicular to the H-shaped foundation, are two low wall fragments, set parallel to one another and approximately three feet apart. A large wooden block is mounted on the top of the south wall, while the top of the north wall has three transverse niches from which pairs of threaded rods protrude. These features were probably associated with the available power source from the dam at some time after the furnace ceased operation, but their use is not known at this writing (November 1988).

HISTORICAL BACKGROUND

(Note: This historical background has been largely excerpted from two technical reports prepared for the National Park Service and the United States Army in support of cultural resource investigations on the Fort Drum Military Reservation; see Friedlander et al. 1986: 2-1 - 21; and Friedlander et al. 1988: 19-24.)

The earliest settlement in the vicinity of Fort Drum is associated with Long Falls (now Carthage), which was surveyed and settled between 1793 and 1798 (Powell 1976:119). Until the 1790s, this area was generally known as the "North County", and tensions between the United States and Great Britain, chaotic land policies, and unstable currencies all worked to inhibit permanent occupation of the area (Powell 1976: 16). New York State's land policies, established in 1786, regulated survey and sale of public lands and excepted purchasers from taxation for seven years after acquisition as long as the land was settled within that period. This resulted in a period of land speculation along the frontier (Powell 1976:17).

In 1791, Alexander Macomb, who had already made one fortune in the fur trade as John Jacob Astor's partner, bought 1,920,000 acres, comprising most of Franklin, St. Lawrence and Jefferson Counties, and all of Lewis County (Powell 1976: 113). Macomb soon went bankrupt and one of his partners, William Constable, had to sell off their holdings. Constable peddled some of the tracts to friends in New York and then went to France in 1792 to try to sell property to wealthy Frenchmen, eager to leave France following the fall of the Bastille in 1789. Among these was James LeRay, whose father had been active in 18th century transatlantic commerce and had supported the American Revolution, and who had already become an American citizen in 1788. LeRay introduced Constable to his brother-in-law, Paul Chassanis. With LeRay, Chassanis formed the Castorland Company, and in August 1792, he and Constable executed a deed for 630,000 acres in what eventually became Lewis and Jefferson Counties (Powell 1976:117-119).

Unfortunately, the deal went sour. In March of the following year, Constable sold Chassanis 210,000 acres in the area approximately bounded by Rome, Watertown, the Black River and Lake Ontario. One city, Basle, was projected in the Black River valley near Lake Ontario; the sale eventually led to the founding of Long Falls between 1793 and 1798 and settlement of 20 French aristocratic families in Castorland between 1796 and 1800. In 1798, however, the New York Legislature rescinded permission for French citizens to hold property in New York. LeRay acquired all

of Castorland; the settlers went home to France, where they were welcomed back by their government in 1800, and by 1804, the area was nearly deserted. They left behind 82 acres of cleared land, 18 log cabins, 1 saw mill, and several unusable roads (Powell 1976: 1804).

James LeRay returned to France in 1790 to settle his father's affairs, and he came back to the United States in 1802 (Fort Drum Public Affairs Office 1981: n.p.; Powell 1976: 141). Two years earlier, he had purchased 220,000 acres (previously part of the Chassanis holdings) from the Antwerp Company (Fort Drum Public Affairs Office 1981: n.p.). In 1802, LeRay took over the rest of the Chassanis tract and then sold some of his immense holdings to a group of Pennsylvania Quakers, who founded the town of Philadelphia (Powell 1976: 141).

Although the French abandoned their settlement at Long Falls by 1804, pioneers from Connecticut, Vermont and Massachusetts began to trickle into Jefferson County between 1979 and 1800, settling primarily south of the Black River. Noadiah Hubbard made the first permanent settlement in Champion in 1798, and Lyman Ellis founded Ellisburg the same year. Two years later, Henry Coffeen, Hart Massey and others settled Watertown, and in 1802 a dam was built across the Black River at the foot of Mill Street in that village. Pioneers were primarily Congregationalists, although some Quakers migrated from Pennsylvania and a few Baptists from Long Island. In search of fertile farmland, they settled in family and small community groups and were self-governed on the New England model until the area was organized by the state in 1798 as part of Oneida County (Gould, comp. 1955:13; Powell 1976:145).

The presence of a mill occurs repeatedly in the early histories of small towns and villages in the area. Sawmills were found on Pleasant Creek in LeRaysville by 1802, and on Black Creek, one and a half miles above the future site of Sterlingville, by 1807 (DeLaire 1977: n.p.). An early, but undated, survey of Champion shows Gardners' Mills and Great Bend Bridge on the Black River (Map of Black River Tract, Township 4, Jefferson County, n.d., on file at New york State Department of Tax and Finance, Albany).

By 1810, Jefferson and Lewis Counties had been created out of Oneida. As of 1820, there were 54 gristmills in Jefferson County, of which one was in Antwerp, five were in Champion, seven were in LeRay, one was in Philadelphia, five were in Watertown, and two were in Wilna. The number of sawmills (107) in the county exceeded the number of gristmills, and were also usually more frequent in towns and villages: four in Antwerp, three in Champion, 12 in LeRay, three in Philadelphia, seven in Watertown, and four in Wilna. A similar ratio is indicated in Lewis County,

which reported 16 gristmills in 1820 and 46 sawmills (Burr 1829). Road building also attended the development of rural industries and villages in the region. By 1806 there were 13 roads surveyed in LeRaysville, and by 1808, a road connected LeRaysville with Evans Mill. Within five years, the St. Lawrence Turnpike was constructed through Wilna (Klein et al. 1985: 2-20). The road forked; the Ogdensburg Turnpike went through Antwerp, and the St. Lawrence continued through Lewisburg and Diana Township (Map entitled "Parts of Jefferson and Lewis Counties", n.d. [ca. 1800-1810?], New York State Department of Tax and Finance, No. 241).

Another catalyst of village formation, although on a much more limited scale, was the emergence of a local iron industry in the early 19th century. Iron processing in New York State as a whole dates to 1740, when Philip Livingston and his partners established a plant that included both a blast furnace and a refinery forge on Ancram Creek in Columbia County, about 14 miles east of the Hudson River (Swank 1884: 101). Iron ore was discovered in Orange County, west of the Hudson, in the middle of the eighteenth century, and many furnaces and forges were built nearby. The first and most famous of these were the Sterling works owned by Peter Townsend, where the famous iron chain that spanned the Hudson and West Point during the Revolution was manufactured (Lewis 1976: 18; Swank 1884:103, 104). Numerous iron works were established in the counties adjacent to the Hudson, south of Albany, prior to 1800, an area which became the seat of the state's iron and steel industry in the 19th century. After 1800, ore beds in the vicinity of Lake Champlain were discovered and exploited (Swank 1884:107; Seely 1978).

According to the American Iron and Steel Association, New York state by 1876 contained four types of iron making plants: charcoal-fueled blast furnaces, anthracite-fueled furnaces, rolling mills, and Catalon forges or bloomaries. Generally, anthracite furnaces and rolling mills were found along the Hudson River or the Erie Canal and its feeders. Catalon forges tended to cluster in the Adirondacks, west of Lake Champlain. The relatively few charcoal-fueled blast furnaces were found in the area of what is now the Fort Drum reservation, or in the lower Hudson region where the industry had originated in the state.

During the early decades of the 19th century, a number of entrepreneurial individuals sought to exploit the natural resources (water power, iron ore, limestone and wood) for production of iron (Allen 1980). The most successful of these individuals was James Sterling, who by the middle of the century held controlling interests in iron works at three locations, Sterlingberg, Sterlingville and Lewisburg (Sterlingbush). All the iron works established within the area of Fort Drum were

charcoal fueled, and, with possible limited exceptions, cold-blast operations. None proved consistently productive or successful, and all had closed by the 1880's (Friedlander et al. 1988: 20). Within their short period of existence and usually intermittent intervals of operation, however, the furnaces of the area's iron industry provided a variety of employment opportunities for local inhabitants, and formed the nuclei for several industrial villages. Four townsites (James Sterling's three villages, plus a furnace and sawmill site known as Alpina) remain within and adjacent to Fort Drum as a legacy of iron making in the region.

LEWISBURG FURNACE

The stone stack at Lewisburg represents the remains of a furnace "reconstructed" in 1873 from an earlier structure at the site, and thus the last in a series of efforts extending to the 1830's to produce iron at this location. The earliest recorded activity at the site of Lewisburg is the construction of a sawmill (and presumably a dam) on the Indian River in 1825, at the direction of the absentee owner, Joseph Bonaparte (Child 1872:92). According to Hough (1860), however, the original name of the site,"Louisbourg" (now Lewisburg), dates to an 1831 effort by four Frenchmen, Lewis Fennel and brothers Nicholas, Constant and Charles Jomaine, to produce iron at this location. A cold blast furnace, 33 feet square at the base, was in operation in 1832, producing two or three short blasts from locally-available bog ore (Hough 1860:97).

The earliest deed in which the furnace site can be identified is from 1842, when it was part of a 5280-acre tract which John Lafarge sold to Isaac Lippencott, Joseph Morgan and David Reamer, a New Jersey partnership (Lewis County Deeds (hereinafter LCD) X:29). Hough (1860), however, places the triumvirate in association with the enterprise as early as 1836, and credits them with reconstruction of the stack to measure 28 feet square with a 7 1/2-foot bosh. Also according to Hough, they introduced hot blast machinery and for a few years manufactured pit iron and various castings, including stove parts, using ore obtained from the Kearny mine in Gouverneur as well as other suppliers in St. Lawrence County. These items were sold in Rochester. A late 1830's date is also given by Nielsen (1867), who then dated the furnace to 1837, but credited its (re) construction to James Sterling. If Sterling was indeed involved in the enterprise in the 1830's, it was not as an owner. During the 1840's, Lippencott gradually bought out his partners, and not until Lippencott achieved 100% interest did Sterling (or rather, interests in the form of his brother, wife and business partner) acquire the property, in a transaction dated 1851 and recorded in 1853 (LCD Y:249; 3:659; 10:326).

Two accounts indicate that another reconstruction of the furnace occurred in 1852 (Child 1872:92; AISA 1882:16). This presumably took place under Sterling's aegis, as suggested by Hough's mention that Sterling spent not only $10,000 for the tract (a figure substantiated by the deed) but also $13,000 to "rebuild" the operation (Hough 1860:98; LCD 10:326). In addition to reconstructing the furnace, Sterling initiated a variety of improvements within the area of the small industrial village by draining swamps, clearing land, and building roads. Irish

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laborers were brought in and land donated for a Catholic Church Child 1872: 92; Bean 1974:21-22). The hamlet, which became the site of a post office, was renamed Sterlingbush. In 1857, the village, spanning both sides of the Indian River, contained, in addition to the furnace (and a sawmill on the opposite bank of the river), a hotel, store (containing the post office), schoolhouse and possibly 14 dwellings, most owned by Sterling (Ligowsky 1857).

James Sterling died in 1863, and Sterlingbush furnace was operated by A.P. Sterling as lessee. Between 1854 and 1866, the furnace was in operation all but one year (1860), producing as follows (Neilson 1867):

1854	1210 tons
1855	1481 tons
1856	1344 tons
1857	1045 tons
1858	1000 tons
1859	60 tons
1860	0 tons
1861	470 tons
1862	425 tons
1863	1400 tons
1864	1275 tons
1865	1200 tons
1866	300 tons

According to Allen (1980), the stack measured 33 feet high and 9 feet across the bosh. Power for the blast was provided by a breast wheel, 18 feet across with nine-foot buckets (Neilsen 1867). The double-acting cold-blast cylinder was 5.5 feet in diameter and made 7 revolutions per minute with a four-foot stroke.

In 1869, all of the Sterling holdings at Lewisburg were acquired by the Jefferson Iron Company, and the furnace was rebuilt, for the last time, in 1873 (Child 1872: 92; AISA 1882: 16). However, the Jefferson Iron Co. was less interested in producing pig iron than in mining iron ore, and the company gradually abandoned the furnace (see Bowen 1970: 156, 174). The enterprise was listed in the directories of the American Iron and Steel Association from 1873 to 1880 (AISA 1874:13; 1876:14; 1878:15; 1880:16), but no actual production figures are recorded and it was closed permanently in 1881. The village, which had regained its original name (anglicized to "Lewisburg") under the Jefferson Iron Company, remained on the banks of the Indian River until the early 1940's, when all structures except the furnace stack were razed.

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